

## Private space flight

### A private company heads for the International Space Station

SIX years ago, when NASA, America's **space agency**, announced it wanted the private sector **to take over responsibility** for **ferrying cargo** to the International Space Station (ISS), many **scoffed** that it was a fantasy. But yesterday's fantasy has become today's reality, and private enterprise is busy **putting together** rocket-propelled delivery vans to do just that—and, **eventually**, to take astronauts as well. One of the leading firms in the field, SpaceX, has already **notched up** a string of successful flights (and a few failures, too) with its Falcon rockets, pictured above. This month it will attempt its most **ambitious** mission yet: a **rendezvous** with the space station.

If all goes according to plan, a Falcon 9 rocket carrying an **unmanned** Dragon space capsule will **blast off** from Cape Canaveral in Florida. After three days in orbit, the Dragon will put itself on a trajectory that will bring it close to the station, starting an intricate orbital dance that will allow SpaceX and the astronauts aboard the station to test the capsule's communications and manoeuvring systems. If everything checks out, then the Dragon will **nose** right up to the ISS. The astronauts on board will grab it with a robotic arm and link it to the station, and the first private-sector delivery to the space station will then have **taken place**.

Both NASA and SpaceX are at pains **to point out** that the flight will be a test, rather than a fully fledged operation. Although the Dragon—which has been designed from the start to transport astronauts one day—will be carrying cargo, nothing vital or **irreplaceable** will be on board. Nevertheless, says Mike Gold of Bigelow Aerospace, a firm that plans to build **inflatable space stations**, SpaceX's launch could well be “the most important day ever for private space flight”.

#### Pride and prejudice

There is certainly a lot riding on a successful launch. Money, **for one thing**: so far, NASA has given SpaceX almost \$400m to develop its rocket and capsule. The firm's investors—including Elon Musk, its founder, who made his fortune with PayPal, an internet-payments firm—have **put in** hundreds of millions more. If it **all goes off** without a hitch, then SpaceX will be in a position to begin a 12-flight commercial cargo contract to the ISS worth \$1.6 billion, probably before the end of the year.

National pride is also involved. With the retirement last year of the space shuttle, America, which has made by far the biggest contribution to the \$100 billion cost of the ISS, has no home-grown way to get there. That leaves it **reliant** on the Russians, Europeans and Japanese to fly cargo missions. Only the Russians, with their **venerable** Soyuz spacecraft, can take astronauts, a service for which they charge NASA \$450m a year. The agency's next spacecraft designed to carry people will not be ready until 2020 at the earliest. A successful cargo service would be a crucial step along the road to NASA's eventual goal of using private firms to fly astronauts as well. But perhaps the biggest factor of all is that, if SpaceX is successful, it will be a demonstration of the idea that a small private firm can do something that has, until now, been the preserve of nation-states.

In one sense, private space flight is nothing new. NASA has never been in the business of building rockets or spacecraft itself, preferring **to rely on** private contractors such as Boeing and Lockheed Martin to do the actual design and construction work. What is different this time is the way the money is being **doled out**.

The old way was “cost-plus” contracts, in which NASA promised to pay whatever it took to build a rocket (the “cost” part), plus a guaranteed profit (the “plus”). SpaceX and its competitor for cargo-delivery services, Orbital Sciences, are being paid on a fixed-cost basis. NASA hands them **a dollop of money** and any risk of cost overruns is borne by the firms themselves. The hope is that, under the discipline of such contracts, firms will be able to cut dramatically the cost of reaching orbit. SpaceX already makes much of a comment last year by a Chinese government official, that the firm's launch costs are the lowest in the world and that China's own rockets cannot hope to match them.

Yet SpaceX—and indeed the very idea of private space flight—has plenty of **opponents**. Neil Armstrong and Gene Cernan (respectively the first and the last men on the moon) are among those who fret that the private sector simply will not be up to the job. There are opponents in Congress, too, where NASA is seen as a valuable source of pork by many senators and representatives with part of the space industry in their districts.

Last month the Senate suggested that the government should **pony up** \$525m for the programme to deliver crews to the space station using commercial rockets. The House of Representatives proposed \$500m. Either figure is well short of the \$830m that President Barack Obama had requested on NASA's behalf. More worrying, the House Appropriations Committee suggested that NASA should cut the number of competitors for its crew-delivery contracts from four (SpaceX, Boeing, Blue Origin and Sierra Nevada) to one.

For its part, NASA seems **confident**. This month's test is a merger of what were originally intended to be two separate missions. NASA was sufficiently impressed with SpaceX's progress that it gave the go-ahead last year to combine them into one. Yet rocket science is difficult—just ask the North Koreans, whose past three launches have all ended in failure. And the launch has already been postponed several times from its original date of February 7th for various reasons, including **last-minute problems** with the Dragon's software.

### **Sense and sensibility**

A failure this time would mean flying another test, and a delay in the activation of SpaceX's contract. It would also strengthen the hand of congressional objectors to the idea of contracting out launches in this way. That would not be fatal to SpaceX, which has other sources of money including contracts with three satellite firms—ORBCOMM, SES and Iridium—and with America's air force. But a spectacular failure (a launch-pad explosion, say, rather than a mere failure to dock) could spell big trouble for NASA's entire commercial space strategy. Those in favour of cheaper, easier access to space, therefore, should be **cheering** the Dragon **on**.

### **Vocabulary tasks**

- 1) Give definitions of the words in bold type.
- 2) Find the meaning of all phrasal verbs in the text.
- 3) Make up 5 special questions.